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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/521.060

12/30/2004

Seiji Nakahata

39.058

8583

29453

7590

08/21/2006

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EXAMINER

LE, THAO P

ART UNIT

PAPER NUMBER

2818

DATE MAILED: 08/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/521,060

Applicant(s)

NAKAHATA ET AL.

Examiner

Thao P. Le

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/30/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claims 1-9 are pending in this application.

Priority

Acknowledge is made of applicants' claim for foreign priority base on an application 11-007970 filed in Japan on 1/14/1999.

It is noted that Applicants have filled a certified copy of said application as required by U.S.C 119, which papers have been placed of record in the file.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 12/30/04 was filed on the same mailing date of the application. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by

another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-2, 4-5, 8-9 are rejected under 35 USC 102 (e) as being anticipated by Nagai, EP 1378934, hereinafter Nagai.

Regarding claim 1, Nagai discloses a method of manufacturing a group III-V crystal, characterized in comprising: a step of depositing a metal film on a substrate (layers 41, 42, [0039], metal of high melting point such as Ti or W); a step of heat-treating the metal film under an atmosphere in which a patterning compound is present (the substrate is heated, [0044], the temperature is maintained high at the whole time, [0048], the pattern compound is present so that the metal layers are patterned to become 41m and 42m); a step of growing a group III-V compound crystal 32 on the metal film (layer of group III-V compound GaN is grown in the layer 31, [0048]) (See Figs. 1A-1H).

Regarding claim 2, Nagai discloses a method of manufacturing a group III-V crystal, characterized in comprising: a step of depositing a metal film on a substrate

(layers 41, 42, [0039], metal of high melting point such as Ti or W); a step of heat-treating the metal film under an atmosphere in which a patterning compound is present (the substrate is heated, [0044], the temperature is maintained high at the whole time, [0048], the pattern compound is present so that the metal layers are patterned to become 41m and 42m); a step of growing a group III-V buffer film 32 on the metal film (layer of group III-V compound GaN is grown in the layer 31, [0048]) and a step of growing a group III-V crystal 203 on the buffer film (Fig. 4) (See Figs. 1A-1H and third embodiment; [0056-0057]).

Regarding claim 4, Nagai discloses the substrate is silicon, sapphire, SiC, or group III-V compound [0032].

Regarding claim 5, Nagai discloses the metal contains titanium [0039].

Regarding claim 8, Nagai discloses a group III-V compound crystal formed by method as set forth in any of claims 1 to 7 (claim 1 or 2).

Regarding claim 9, Nagai discloses the group II-V compound crystal as set forth in claim 8, the III-V crystal being $GaxAlyIn_{1-x-y}$ [0001].

Claims 1-2 are rejected under 35 USC 102 (e) as being anticipated by Japan Application No. 10335851 (or Publication No. 2000164988), submitted by Applicant as IDS.

Regarding claim 1, Japan Application No. 10335851 discloses a method of manufacturing a group III-V crystal, characterized in comprising: a step of depositing a metal film on a substrate (the metal film of Ti, Pt, or the like); a step of heat-treating the

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metal film under an atmosphere in which a patterning compound is present (the pattern compound is inherently present to pattern the metal layer as shown in Figs 8 or 13); a step of growing a group III-V compound crystal on the metal film (Figs. 8-15; Abstract).

Regarding claim 2, Japan Application No. 10335851 discloses a method of manufacturing a group III-V crystal, characterized in comprising: a step of depositing a metal film on a substrate (the metal film of Ti, Pt, or the like); a step of heat-treating the metal film under an atmosphere in which a patterning compound is present (the pattern compound is inherently present to pattern the metal layer as shown in Figs 8 or 13; Abstract); a step of growing a buffer layer and then a group III-V compound crystal on the substrate (Figs. 8-15).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3, 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagai, EP 1378934, hereinafter Nagai.

Regarding claims 3, 6-7, Nagai fails to disclose the thickness of the metal film. Nagai discloses the temperature is at 800-1200 oC but fails to disclose the duration of the heat treatment. However, the selection of the parameters such as **energy, concentration, temperature, time, molar fraction, depth, thickness, etc.**, would have been obvious and involve routine optimization which has been held to be within the level of ordinary skill in the art. "Normally, it is to be expected that a change in **energy, concentration, temperature, time, molar fraction, depth, thickness, etc., or in combination of the parameters** would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art ... such ranges are termed "critical ranges and the applicant has the burden of proving such criticality.... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller* 105 USPQ233, 255 (CCPA 1955). See also *In re Waite* 77 USPQ 586 (CCPA 1948); *In re Scherl* 70 USPQ 204 (CCPA 1946); *In re Imscher* 66 USPQ 314 (CCPA 1945); *In re Norman* 66 USPQ 308 (CCPA 1945); *In re Swenson* 56 USPQ 372 (CCPA 1942); *In re Sola* 25 USPQ 433 (CCPA 1935); *In re Dreyfus* 24 USPQ 52 (CCPA 1934).

When responding to the office action, Applicants' are advice to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thao P. Le whose telephone number is 571-272-1785. The examiner can normally be reached on M-T (7-6).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Nelms can be reached on 571-272-1787. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Thao P. Le', with a stylized, flowing script.

Thao P. Le
Primary Examiner
Art Unit 2818
August 14, 2006.